

# Preface

This book is about trade in ideas. The special focus is the performance and behavioral properties of *markets* in patents with prices.

The framing of the problem comes from change in economic organization in history: from a *personal* exchange in technology (technical ideas) between people within hierarchies (guilds, firms, and nations) without legal rights to the *ideas*, to an *impersonal* exchange *between* hierarchies through markets based on the patent system, granting exclusive, and transferrable and licensable rights on technical ideas, making exchange with transparent (public) prices possible.

This shift began in Venice in 1474 with the creation of the first patent system. (Patents on technology surfaced a little earlier in Florence in 1421, as far as we know today, but the patent *institution* came half a century later). The system was put into law in the wake of financial difficulties of the dynamic city state, at the time known for its trade in industrially manufactured products and financial services, and was a deliberate economic policy to give incentives to *import* (trade), create (produce), and share (publish) the knowledge of new technology to boost *economic* development. The new policy replaced previous government subsidies and secrecy as mechanism for increased knowledge production. Honoring the Inventor's work would attract more people with creative minds to the city state, and create incentives to make previously held secrets public information, creating social gains through technology competition (learning by sharing), and market gains through specialization between Inventors, Investors (Traders), and Innovators.

These central issues of organized exchange, with prices, are at the heart of the study. It includes a patent licensing contract used to exchange the technology and mechanisms with different rules of trade. An informal discussion on what price (theoretically) ought to be paid for efficient outcomes – coinciding with what people do – decides much of the parameters. The study also implies for the role of the patent system as a trade system. A key patent parameter for tradability, the presumed validity (strength) of the granted patent, is included in the economic environment. The performance and behavioral properties of this complex institutional and economic environment, generating outcomes of allocation and prices is then studied in

two laboratory experiments: The first focusing on prices and price formation and the second on coordination of investment decisions through price signaling. The experimental design institutions and environment allows testing the principles, capturing some key dynamic behavior of such exchange, making the case for parallelism to real-world trade in ideas. The experimental design is probably one of the first laboratory experiments in organized markets attempting to capture unique key characteristics of the patent system. Some of these characteristics may hopefully serve as inspiration for a broader scope of similar market design experiments.

The book begins with this brief economic history of the patent system. An experimental design is then addressed, introducing the components of the experimental environment and the institutions (the experimental economic *system*). The informal theory of the contract studied in the experiments is the proposed, suggesting that the *blocking value* of a patent (the value to “sit on” a right and use other technologies for now) is formally similar to insurance. The *investment value* (using the patented technology) is treated as a net present value investment under uncertainty (risk). The *trade value* is equal to “doubling” the market access through two noncompeting Innovators. This is the dynamic value. The mechanisms are then discussed in detail as the limited presumed validity of a patent (the chance it will be upheld in court if challenged). Each specialized hierarchy (Inventor, Trader/Investor, and Innovator) is given a definition by their action space. The economic system model attempts in a nut shell to summarize the basic principles of the patent system and how it has been and is used for the past 500 years. This analytical narrative has similarities in principle and to extant more personal exchange in patents.

The experimental sessions are then described in a historic narrative, one chapter for each experiment. This allows the reader to better understand the dynamics that are at play. A “participant study” is made asking the participants to describe how to succeed in the experiment to future participants. Finally, a discussion in statistical terms is done and policy conclusions drawn on trade in ideas based on the patent system.

Key results are that impersonal exchange in ideas with a fixed fee and royalty on sales contract supports the market access *insurance* hypothesis, and introducing rules of trade (institutions) doubles the performance of such markets. The typically very high efficiencies of experimental markets are not achieved. This may be a result of the experimental design or the risk preferences of participants, a behavioral issue not fully captured by the contract traded. These and other results are hopefully useful for policy development in a (uncertain) idea, or knowledge, economy, increasingly based on exchange in technical ideas through the patent system.

This book is a reduced version of my doctoral dissertation. I am grateful to a number of people who have made this process successful. The research is influenced by 20 years of management consulting in strategy and many years of working with the patent system strategy, especially from the European Patent Office. Here I would like to mention two people in particular: Ciaran McGinley, at the President’s office, with whom I had the pleasure to work closely on strategic issues of the European Patent System for 6 years, and Dr. Ulrich Schatz, Principal Director of

International Affairs, who sponsored that joint work and introduced me to nearly every aspect of the global patent system at a level of principle and practice!

The academic research, whose findings this book report, has been carried out at the Interdisciplinary Center for Economic Science (ICES) at George Mason University, USA with affiliation to the doctoral program at the Royal Institute of Technology (KTH) in Sweden. Björn Hårsman, my principal adviser at KTH has given unwavering academic and practical support from the start. He also orchestrated much of the administrative and academic support needed for the project to come to a successful end. Critical funding of the project that made the research at ICES-GMU possible has been provided by the Savings Bank's Research Foundation (Sparbankernas Forskningsstiftelse), headed by Dr. Enrique Rodriquez. Åke E. Anderson has given invaluable advice on where to find excellence, and how to divide and focus academic work in relevant parts. I am also thankful to Stellan Lundström and Börje Johansson for their input on various parts of this manuscript.

Central to this research was understanding experimental economics, and I owe this understanding to the team at the ICES, especially Steve Rassenti, who invited me to come to learn experimental economics and do experiments and generously gave of his time. Many thanks to Vernon Smith for his sharp and constructive economic problem formulations, which launched the work forward into a working experimental design and avoided many dead-ends. Running several pilot-runs to observe the incentive structure prior to data collection turned out to be instrumental in arriving at a working design. David Porter gave insights in the problematization and economic system design which helped (together with Vernon's input and Steve's focus to look at personal exchange solutions from the real-world) to direct the research to solve the linear contract problem, the hardest nut in the whole research project. Dan Houser provided excellent input in discussions to solve the statistical analysis of these complex markets, making the statistic intuitive and understandable.

Finally, I would like to extend a special thank you to Springer's Nicholas Philipson and this book series editor, E. Carayannis, for making this publication possible, and to the accommodating editorial staff of Springer and SPi Global. In the process they challenged me to clarify my own thinking in several sections.

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